

MIL-L-50064C

30 SEPTEMBER 1964

**SUPERSEDING
MIL-L-50064B(MU)
21 MAY 1963**

MILITARY SPECIFICATION

LENSES, OPHTHALMIC, SIMPLE (FOR ABC-M17 MASK)

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers two types of cast, cylindrical, plastic lenses.

1.2 Classification. Lenses shall be of the following types, as specified (see 6.2):

Type I – Lens, C5.

Type II – Lens for M1 outsert.

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

MILITARY

MIL-B-117 – Bags and Sleeves, Interior Packaging.

STANDARDS

FEDERAL

FED-STD-406 – Plastics: Methods of Testing.

MILITARY

MIL-STD-105 – Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129 – Marking for Shipment and Storage.

DRAWINGS

EDGEWOOD ARSENAL

C5-2-951 – Lens, C5.

C5-2-1000 – Lens, Outsert.

PUBLICATIONS

EDGEWOOD ARSENAL INSTRUCTION MANUAL

FSC 4240

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136-300-118 - Simple, Ophthalmic Lens; Operation and Maintenance of Shadowgraph.

Note. Use figure 1 of this specification in lieu of the figure 1 specified in the instruction manual.

(Copies of specifications, standards, drawings, and publications required by the suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

UNIFORM CLASSIFICATION COMMITTEE

(Application for copies of these freight classification rules, should be addressed to the Uniform Classification Committee, 202 Union Station, Chicago 6, Ill.)

3. REQUIREMENTS

3.1 Material. The lens shall be fabricated of cast, thermosetting plastic material using allyl diglycol carbonate as the basic monomer in the formulation (see 6.4).

3.2 Manufacture. The lens shall be manufactured in accordance with Drawing C5-2-951 or C5-2-1000, as applicable.

3.3 Light transmission. The lens shall transmit a minimum of 89 percent of the incident visible light when tested as specified in 4.7.1.1.

3.4 Haze. Haze shall be no more than 4.0 percent when tested as specified in 4.7.1.1.

3.5 Prismatic effect. The prismatic effect of the lens shall not exceed one-eighth diopter in the vertical meridian nor more than three-eighths diopter in the horizontal meridian when tested as specified in 4.7.1.2.

3.6 Refractive power. The refractive power of the lens shall not exceed plus or minus one-eighth diopter when tested as specified in 4.7.1.3.

3.7 Local distortion. The lens shall exhibit no regions wherein the difference in prismatic effect or refractive power exceeds one-eighth diopter in any meridian when tested as specified in 4.7.1.4.

3.8 Local defects (see figure 1). When tested as specified in 4.7.1.5, any local defects present in the lens shall satisfy the following requirements:

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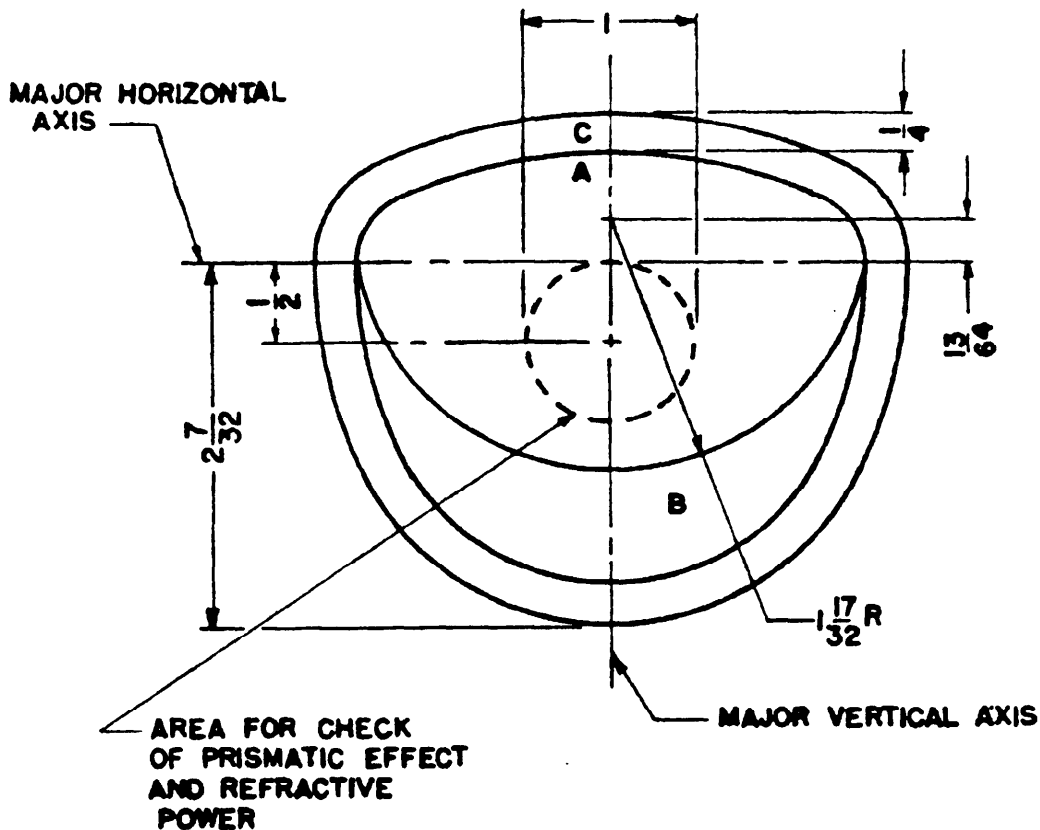


FIGURE 1. Lens, cylindrical, plastic.

3.8.1 Magnitude. The lens shall exhibit no local defect whose magnitude or intensity exceeds the allowable maximum for the applicable zone.

3.8.3 Number. The total number of detectable local defects in the lens shall not exceed two in zone A or five in zone B.

3.8.3 Proximity. In zones A and B there shall be no two detectable local defects separated by less than $\frac{1}{4}$ inch; in zone C there shall be no two detectable local defects separated by less than $\frac{1}{8}$ inch.

3.9 Durability.

3.9.1 Boiling. The lens shall show no discoloration or evidence of fracture and its

radius of curvature shall not change by more than ± 10 percent when tested as specified in 4.7.2.1.

3.9.2 Thermal shock. The lens shall show no discoloration or evidence of fracture and its radius of curvature shall not change by more than ± 10 percent when tested as specified in 4.7.2.2.

3.9.3 Room temperature impact. The lens shall neither fracture nor chip when tested as specified in 4.7.2.3.

3.9.4 Low temperature impact. The lens shall neither fracture nor chip when tested as specified in 4.7.2.4.

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3.9.5 *Mar resistance.* Haze shall be no more than 5.0 percent when tested as specified in 4.7.2.5.

3.9.6 *Chemical resistance.* The lens shall show no discoloration or crazing when tested as specified in 4.7.2.6.

3.10 *Preproduction sample.* Prior to the start of regular production, a preproduction sample of 30 lenses shall be produced using the same methods, materials, and equipment as will be used during regular production. Any change in materials and operating conditions shall require a new preproduction sample.

3.11 *Workmanship.* The lens shall be colorless, smooth, and free from blemishes (internal and external), striae, waves, and damage such as cracks, splits, and other visible defects as revealed in shadowgraph examination, in accordance with Instruction Manual 136-300-118, which will impair its appearance or cause distortion of vision. In addition, the lens shall be free from foreign matter. Workmanship defects of a magnitude greater than the referee standards established by the Government for Major A, Major B, Major, and Minor defects (see 6.6) shall be categorized under the appropriate defect class.

4. QUALITY ASSURANCE PROVISIONS

4.1 *Responsibility for inspection.* Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to insure that supplies and services conform to specified requirements.

4.2 Special provisions.

4.2.1 *Alternative inspection.* The supplier may utilize any alternative inspection procedure which will provide equal or better assurance of quality by submitting a written proposal with justification and obtaining written approval from the Government prior to instituting the procedure. In case of dispute, the procedures of this specification will govern.

4.2.2 *Objective evidence.* The supplier shall provide objective evidence acceptable to the contracting officer that the requirements of 3.1 and 5 for which specific inspection has not been provided in this specification have been satisfied.

4.2.3 *Inspection substation.* If the supplier elects to establish inspection substations for the purpose of conducting inspection for certain listed defects, the Acceptable Quality Levels (AQL's) for each inspection substation shall be equal to the AQL which is the next numerically lower value than the AQL specified for the total listed defects. The requirements of MIL-STD-105 are applicable to each substation and to the end item.

4.3 Preproduction sample inspection.

4.3.1 *Examination.* The preproduction sample shall be inspected for all the characteristics specified in the classification of defects.

4.3.2 *Tests.* Five lenses shall be selected from the preproduction sample for each of the tests specified in 4.7.2.1, 4.7.2.2, 4.7.2.3, 4.7.2.4, 4.7.2.5, and 4.7.2.6.

4.3.3 *Acceptance/rejection criteria.* The lenses shall meet the examination and tests as specified in 4.3.1 and 4.3.2 to be acceptable. The supplier shall obtain written approval from the contracting officer before proceeding with regular production.

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4.4 Lotting. A regular production lot shall consist of the lenses of one type produced from one batch (see 6.3) of lens-casting compound cured under the same conditions (time, temperature, and mold conditions).

4.5 Sampling.

4.5.1 For examination and nondestructive tests. Sampling shall be conducted in accordance with MIL-STD-105.

4.5.2 For destructive tests. Sampling shall be conducted in accordance with MIL-STD-105, level S-3.

4.6 Inspection provisions.

4.6.1 For examination and nondestructive tests. Sample lenses shall be examined and tested in accordance with the classification of defects and with MIL-STD-105.

4.6.2 For destructive tests. Sample lenses shall be tested as specified in 4.7.1.1, 4.7.2.1, and 4.7.2.5, and MIL-STD-105 using an AQL of 0.65 percent defective for acceptance.

4.6.3 Classification of defects.

4.6.3.1 Lens (see applicable drawing and fig. 1).

Categories	Defects	Acceptance standards
Critical:	None defined.	
Major:	AQL 1.0 percent defective.	
101	Cylindrical radius of curvature incorrect.	
102	Profile incorrect or irregular.	
103	Centerline mark located incorrectly.	
104	Spotty discolorations (zone A).	
105	Sharp edges.	
106	Scratches (zone C).	

Categories	Defects	Acceptance standards
107	Bulge.	
108	Workmanship (3.11).	
109	Room temperature impact (type II only).	4.7.2.3
Major A: AQL 0.65 percent defective.		
150	Prismatic effect excessive.	4.7.1.2
151	Refractive power out of limit.	4.7.1.3
152	Distortion (zone A).	4.7.1.4
153	Defects, over limits (zone A).	4.7.1.5
*154	Room temperature impact (type I only).	4.7.2.3
Major B: AQL 0.25 percent defective.		
160	Cracks or splits.	
Minor: AQL 2.5 percent defective.		
201	Distortion (zone B).	4.7.1.4
202	Defects (over limits zone B).	4.7.1.5
203	Spotty discoloration (zone B).	
204	Thickness incorrect.	

*Perform this test prior to other examinations and tests.

4.7 Tests.

4.7.1 Nondestructive.

4.7.1.1 Light transmission and haze. The light transmission and haze shall be determined using method 3022 of FED-STD-406. Samples taken for mar resistance test (see 4.7.2.5) will be tested for compliance with 3.4 prior to testing for compliance with 3.9.5.

4.7.1.2 Prismatic effect. The prismatic effect of the lens shall be determined using the Edgewood Arsenal Q44 Lens Measuring Instrument.

4.7.1.3 Refractive power. The refractive power of the lens shall be determined using Edgewood Arsenal Q44 Lens Measuring Instrument.

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4.7.1.4 *Local distortion* (see fig. 1) Any region within zones A or B, which in the course of visual inspection or examination in accordance with Instruction Manual 136-300-118 shows evidence of distortion due to irregularity of either surface, inhomogeneity of plastic materials, surface or internal defects, shall be examined in the following manner: Measure the apparent prismatic effect and refractive power (4.7.1.2 and 4.7.1.3) of the affected region, and then the prismatic effect and refractive power of the region adjacent to the affected region, and check for compliance with 3.7.

4.7.1.5 *Local defects*. The lens shall be examined for compliance with 3.8 in accordance with Instruction Manual 136-300-118.

4.7.2 *Destructive tests.*

4.7.2.1 *Boiling*. The lens shall be placed in boiling water for a period of at least two hours. Allow the lens to cool to room temperature. In regular production the lenses tested for mar resistance may also be used for the boiling test.

4.7.2.2 *Thermal shock*. The lens shall be placed in a boiling water bath for at least 10 minutes and shall then be transferred quickly to a crushed-ice bath containing enough water to cover the ice. The ice bath shall be stirred continually for a period of at least 10 minutes, and the lens shall then be removed and allowed to stand at room temperatures for 24 hours, whereupon it shall be examined for compliance with 3.9.2.

4.7.2.3 *Room temperature impact*. Room temperature impact shall be determined using Edgewood Arsenal Q39 Impact Lens Tester. This test is nondestructive when lens is properly cured.

4.7.2.4 *Low temperature impact*. The lens shall be tested using Edgewood Arsenal Q39

Impact Lens Tester, except that the temperature shall be minus $40' \pm 3^{\circ}\text{F}$.

4.7.2.5 *Mar resistance*. The lens shall be abraded in accordance with method 1093 of Fed-Std-406 (equivalent to ASTM method D673-44), using at least 400 grams of abrasive. The lens shall be placed in the abrader with its convex surface up and with the normal to its surface, at the point on the axis of the abrader tube, inclined at an angle of 45 degrees to the axis of the abrader tube. After abrasion, the lens shall be dipped in water and carefully wiped dry with a lint-free cloth or tissue to remove excess abrasive. The lens shall be tested as specified in 4.7.1.1 for compliance with 3.9.5.

4.7.2.6 *Chemical resistance*. Drops of liquid agents GB and H shall be applied to the surface of the lens and allowed to stand for a period of at least 24 hours. The lens shall be decontaminated prior to examination.

5. PREPARATION FOR DELIVERY (For repair parts packaging see 6.5).

5.1 *Packaging, level C*. Lenses (clean, dry and free of lint and other foreign matter) of one type shall be packaged to afford adequate protection from the supply source to the first receiving activity for immediate use.

5.2 *Packing, level C*. Lenses of one type, packaged as specified in 5.1 shall be packed to insure carrier acceptance and safe delivery at first destination for immediate use. Containers shall comply with Uniform Freight Classification rules or regulations of other carriers applicable to the mode of transportation.

5.3 *Marking*. In addition to any special marking required by the contract or order, unit packages and shipping containers shall be marked in accordance with MIL-STD-129.

MIL-L-50064C**6. NOTES**

6.1 Intended use. The lenses covered by this specification are intended for use in the manufacture of the ABC-M17 protective mask.

6.2 Ordering data. Procurement documents should specify:

- (a) The title, number, and date of this specification.
- (b) Type of lens required.

6.3 Batch. A batch is defined as that quantity of material which has been subjected to some unit chemical or physical mixing process intended to make the final product substantially uniform.

6.4 Plastic. A copolymer with CR39 (Columbia Chemical Division, Pittsburgh Plate Glass Company) has been found to be satisfactory in manufacturing the lenses.

6.5 Repair parts packaging. When repair parts packaging and packing is required for

items authorized for stocking as repair parts, the repair parts packaging data sheet covering the lens should be used.

(Copies of repair parts packaging data sheets may be obtained from the Director for Engineering and Industrial Services, ATTN: Chief, Design Branch, U.S. Army Edgewood Arsenal, Md. 21010)

6.6 Referee standards. The Government will furnish referee standards to define the type and category (Major A, Major B, Major, and Minor) of each defect. These referee standards are based upon the defect magnitude and the potential deleterious effect on the wearer.

6.7 International interest. Certain provisions of this specification are the subject of ABC international standardization agreement. When amendment, revision, or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Offices so that the appropriate action may be taken respecting the international agreement concerned.

Custodians:

Army—MU
Navy—SH
Air Force—84

Preparing activity:

Army—MU(EA)

Project No. 4240-0067

International interest (see 6.7)**Review activities:**

Army—MD
Navy—SH

User activities:

Navy—MC
Air Force—84

